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EPC C2D

Installation Manual

English

MAEN977, 2009-05

EPC C2D Installation Manual

Foreword

The EPC C2D series consists of enhanced Panel IPCs. Shock and vibration resistant and functional throughout comprehensive temperature changes, the series features a robust hard-disk drive, fanless CPU and Windows XP as the standard operating system.

The series also offers the option of modifying a number of its features, affording a customized version with a flash-memory, fanless chassis and Windows XP embedded.

The rugged EPC C2D series provides an open platform solution that can be utilized with the customer's choice of software with high performance reliability that's built to last.

This manual describes each model and gives instructions on installation, operation and service.

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Developed and manufactured by Elektronik-Systeme Lauer GmbH & Co KG

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1 Safety Precautions

Both the installer and the owner and/or operator of the EPC must read and understand this installation manual.

1.1 General

- The EPC is intended for industrial use only.
- Read the safety precautions carefully.
- Check the delivery for transportation damage. If damage is found, notify the supplier as soon as possible.
- Do not use the EPC in an environment with high explosive hazards.
- The supplier is not responsible for modified, altered or reconstructed equipment.
- Use only parts and accessories manufactured according to specifications of the supplier.
- Read the installation and operating instructions carefully before installing, using or repairing the EPC.
- Never allow fluids, metal filings or wiring debris to enter any openings in the EPC. This may cause fire or electrical shock.
- Only qualified personnel may operate the EPC.
- Storing the EPC where the temperature is lower/higher than recommended in this manual can cause the LCD display liquid to congeal/become isotopic.
- The LCD display liquid contains a powerful irritant. In case of skin contact, wash immediately with plenty of water. In case of eye contact, hold the eye open, flush with plenty of water and get medical attention.
- The figures in this manual serves an illustrative purpose. Because of the many variables associated with any particular installation, the supplier cannot assume responsibility for actual use based on the figures.
- The supplier neither guarantees that the EPC is suitable for your particular application, nor assumes responsibility for your product design, installation or operation.

1.2 During Installation

– The EPC is designed for stationary installation on a plane surface, where the following conditions are fulfilled:
  - no high explosive risks
  - no strong magnetic fields
  - no direct sunlight
  - no large, sudden temperature changes

– Install the EPC according to the accompanying installation instructions.

– Ground the EPC according to the accompanying installation instructions.

– Only qualified personnel may install the EPC.

– Separate the high voltage, signal and supply cables.

– Make sure that the voltage and polarity of the power source is correct before connecting the EPC to the power outlet.

– Peripheral equipment must be appropriate for the application and location.

– The controlling transformer has to comply with EN60742.

1.3 During Use

– Keep the EPC clean.

– Emergency stop and other safety functions may not be controlled from the EPC.

– Do not use too much force or sharp objects when touching the keys, touch screen etc.

1.4 Service and Maintenance

– Only qualified personnel should carry out repairs.

– The agreed warranty applies.

– Before carrying out any cleaning or maintenance operations, disconnect the equipment from the electrical supply.

– Clean the display and surrounding front cover with a soft cloth and mild detergent.

– Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.

1.5 Dismantling and Scrapping

– The EPC or parts thereof shall be recycled according to local regulations.

– The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor and display.

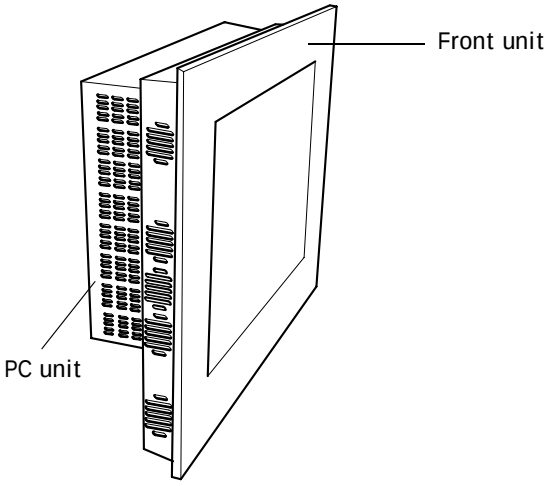
2 Supplied Equipment

Part	Description
CD; operating system	CD with operating system
CD; driver software	Driver software CD for all pre-installed components such as mother board, touch screen, keyboard etc
Power cable	Standard power cable (European or US standard) for units with 230 V AC power supply. Length: approximately 3.0 m. 24 V DC units are delivered without cable. A variety of cables are available separately.
Installation manual	This manual describes specific information about Beijer Electronics products only – not about third party components. **Note:** Separate documentation of third party components is included on the enclosed driver software CD + as printed documentation.
Mounting kit	Screws, nuts etc.

3 Description of Parts

3.1 EPC C2D

The EPC C2D consists of a **Front unit** and a **PC unit**. These are installed in the same way independent of the display size.

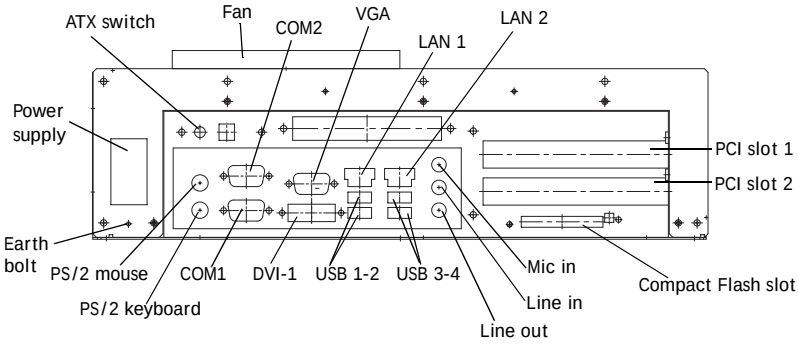


The EPC Box C2D consists of the PC unit only.

3.2 Display

Display sizes 15", 17" and 19" are available, as well as the EPC Box C2D without display.

3.3 Communication Ports



3.4 Motherboard

The EPC C2D has 2 SODIMM slots for main storage and 2 PCI-slots. Further details on the motherboard can be found in a separate manual, included in the delivery.

Note:
The quality of the memory module may influence the system stability. When updating the memory module, or adding a second one, please only use memory modules cleared by Beijer Electronics. Memory modules are electrostatic sensitive components. Relevant protective measures (earth) have to be considered during assembly/disassembly. ESD-protective measures are to be considered when opening and working on the EPC.

3.5 Assembly

A free space of 100 mm, for air circulation, has to be provided around the EPC, to dissipate the heat generated during operation.

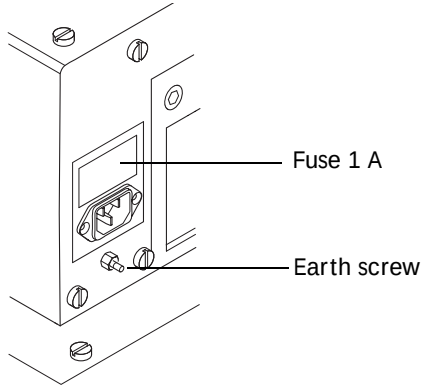
The EPC C2D is assembled with items included in the supplied mounting kit.

Note:
Possible risk of damage to the EPC!
Protection class IP65 for the front panel is only guaranteed with a perfect fitting seal. Pay attention to the torque when fixing the front panel.

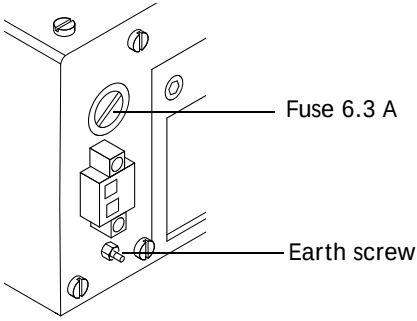
3.6 Power Supply

The EPC C2D is available with 230 V AC or 24 V DC power system.

230 V AC Power Supply Connection with Integrated Fuse



24 V DC Power Supply Connection



The power supply for 24 V DC is carried out via a double-pole connector (Phoenix MST BT 2,5/2).

The EPC C2D is certified for the connection to protective grounded power supply according to EN60950. The EPC Box C2D can also be operated with extra low voltage in accordance with EN60950. The controlling transformer has to comply with EN60742.

Note:
Check the power supply system with the relevant data on the type plate.

3.7 Earthing System

The following items have to be observed to guarantee a safe dissipation of electronic interference:

– The EPC and switch board have to be connected to the nearest possible central earthing point.
– Make sure of a possibly low inductive connection between EPC and switch board.
– All data cables connected to the EPC have to be of the shielded type.
– The screens have to be earthed on both sides. A low ohm connection between the connected systems is essential. Avoid high equalizing currents through the cable screen due to voltage fluctuations.
– The earthing connection is to be carried out with min. 4 mm² cross section.

3.8 ATX Power Switch

Power packs, main boards and operation systems are used in the EPC C2D , using up to date PC-technologies such as ATX and ACPI. Switching on the EPC is done in accordance with ATX specification via the ATX power switch (the red button next to the power supply).

Should a correct automatic booting not function then this can have the following reason:

In the BIOS settings, the option **PWRON After PWR-Fail** in the **Integrated Peripherals/Super IO Device** menu must be enabled, i.e. **On**. See also section *4.2 Default BIOS Settings*.

The operating system must be ended correctly using the **Shut down** command from the operating system menu (Windows start menu), so that the operating system of the EPC is shut down. The EPC must not be switched off while with the operating system is still running.

The power pack now has to be separated from the power supply for a minimum of 15 seconds prior to a re-start. During the booting process the main voltage may not fall (not even for a short time) below the permitted value.

A manual actuation of the ATX power switch, i.e. to start the BIOS menu automatically to check and confirm correct settings, can be necessary if the system registers an error during shut-down or booting. This is not a malfunction but a safety feature.

3.9 ATX Remote Connector

The ATX remote terminal is a double-pole connector close to the the red button ATX power switch button. It is parallel connected to the button. An external push-button switch or a relay contact can be connected to the ATX remote connector.

3.10 Compact Flash Memory Card

An external Compact Flash memory card can be used for data storage. Some EPC models also allow mounting an internal Compact Flash memory card as a boot-up device, or for data storage.

Note:
Only Compact Flash cards distributed by Beijer Electronics may be used. Third party products may cause system malfunction or performance loss.

If a Compact Flash memory card is mounted in/removed from a running EPC, the EPC must be restarted in order to detect the system change.

Booting from a Compact Flash Card

Follow the instructions below, in order to boot the EPC from an internal Compact Flash card:

– Make sure that the Compact Flash card is used as local drive. Standard Compact Flash cards are available only as removeable drives for data storage.

– Confirm that the Compact Flash card is set as first boot device in the BIOS in order to boot the operation system from it.

– Removing the Compact Flash card while the EPC is running may damage the operating system.

4 Operation

4.1 Operating System

The EPC C2D is delivered with Windows XP operating system.

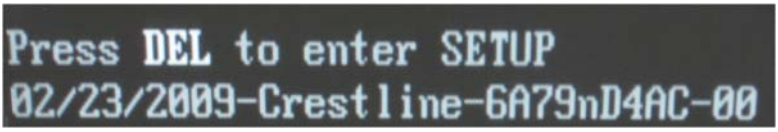
The operating system and other programs are installed on drive “C:”.

Drive “D:” contains all data required for a new installation (drivers and operation system) and may also be used for user data (beneficial for example for data backup).

4.2 Default BIOS Settings

The BIOS settings may need to be checked or altered if the system becomes instable.

To start the setup: Switch on the EPC and press the [DEL] button, according to the first screen image.



Selecting **Load Optimized Defaults** loads the following settings.

Menu	Menu item	Setting
Standard CMOS Features	Date	Current date
	Time	Current time
	Check that all IDE-Devices (HD, CD and CF) are correctly recognized	
Advanced BIOS Features CPU Features	Execute Disable Bit	Enabled
	Virtualization Technology	Enabled
	Core Multi-Processing	Enabled
Advanced BIOS Features	Hard Disk Boot Priority	Default
	Virus Warning	Disabled
	Quick Power On Self Test	Enabled
	First Boot Device	Harddisk
	Second Boot Device	Harddisk
	Third Boot Device	Disabled
	Boot Other Device	Disabled
	Boot Up NumLock Status	On
	Gate A20 Option	Fast
	Security Option	Setup
	MPS Version Control For OS	1.4
	Report No FDD For Win95	No
	Small Logo (EPA) Show	Disabled

Menu	Menu item	Setting
Advanced Chipset Features	System Bios Cacheable	Enabled
	On Chip Frame Buffer Size	8 MB
	DVMT Mode	DVMT
	DVMT / Fixed Memory Size	128 MB
	Boot Display	Auto
	Panel Number 15" 17" 19"	 12: 1024x768 24 bit 13: 1280x1024 48 bit 13: 1280x1024 48 bit
Integrated Peripherals On Chip IDE Device	IDE HDD Block Mode	Enabled
	IDE DMA transfer access	Enabled
	SATA Mode	IDE
	OnChipSerial ATA	Enhanced Mode
Integrated Peripherals Onboard Device	Onboard LAN1 control	Auto
	Onboard LAN2 control	Auto
	Onboard LAN ROM control	Disabled
Integrated Peripherals Super IO	Power ON Function	Button only
	Onboard Serial Port1	3F8/IRQ4
	Onboard Serial Port2	2F8/IRQ3
	PWRON After PWR-Fail	On
	Watch Dog Timer Select	Disabled
Integrated Peripherals USB Device Setting	USB 1.0 Controller	Enabled
	USB 2.0 Controller	Enabled
	USB Storage Function	Enabled
	USB Mass Storage Device Boot setting	Auto mode
Power Management Setup	PCI Express PME	Disabled
	ACPI Suspend Type	S1
	Soft-Off by PWR-BTTN	Instant-Off
	Wake-Up by PCI Card	Disabled
	Power On by Ring	Disabled
	Resume by Alarm	Disabled

Menu	Menu item	Setting
PNP / PCI Configuration	Init Display First	Onboard
	Reset Configuration Data	Disabled
	PCI/VGA Palette Snoop	Disabled
	INT Pin 1 Assignment	Auto
	INT Pin 2 Assignment	Auto
	INT Pin 3 Assignment	Auto
	INT Pin 4 Assignment	Auto
	INT Pin 5 Assignment	Auto
	INT Pin 6 Assignment	Auto
	INT Pin 7 Assignment	Auto
	INT Pin 8 Assignment	Auto
Frequency Voltage Control	Auto Detect PCI / clk	Enabled
	Spread Spectrum	Disabled

4.3 Important Items Regarding Software Installation

The included driver CD includes all drivers needed for a successful reinstallation of the EPC. Since the EPC is not equipped with a CD/DVD player, an external USB CD/DVD player has to be used.

The drivers are also available on the “D:” drive.

When the CD is loaded, a menu is displayed for selection of driver installation, displaying manuals etc. Follow the steps below in the specified order, when re-installing the system:

1. Install the chipset driver.
2. Install the graphic drivers.
3. Install the touch screen drivers.
4. Install the network drivers.

Note:
To avoid always having to re-start the installation procedure of the operating system, we recommend making an image of the new hard disk (using e.g. Norton Ghost, Drive Image etc.). Then you can always fall back on the operational image, if needed.

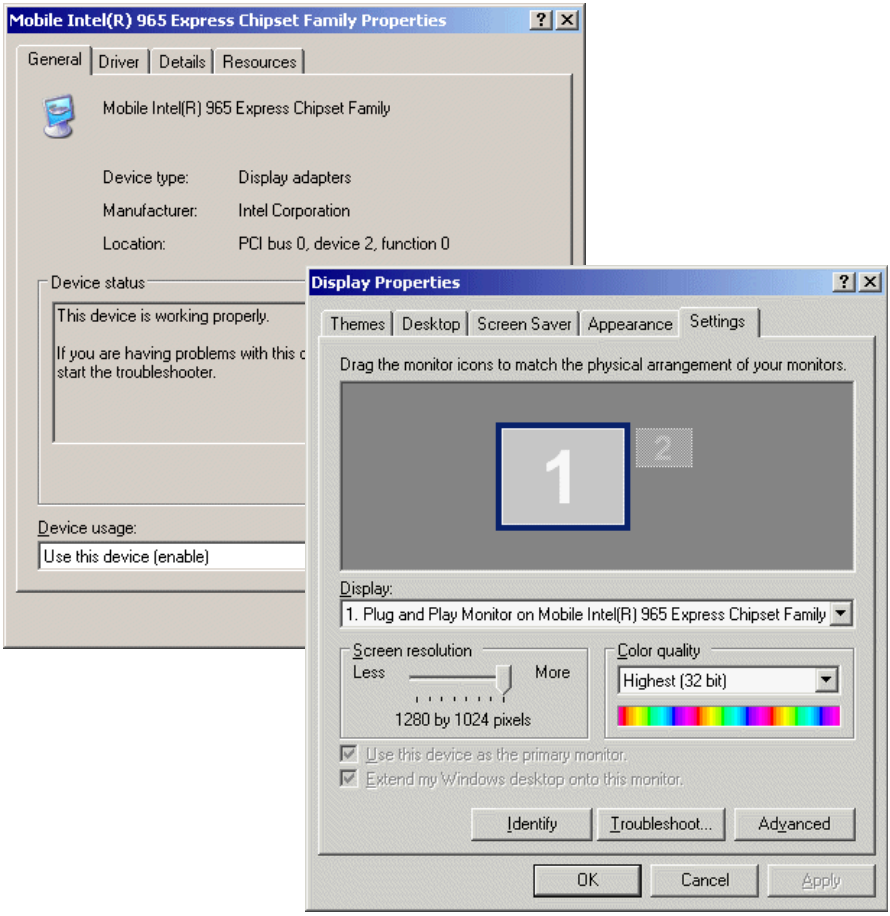
Note:
After operating the system for the first time we recommend that you make start discs (emergency discs). These might be required to restore an operational system. Additionally, we recommend making backup copies of your own data and applications.

4.4 Graphic Board Installation

After finalizing the Windows installation (chipset driver) and re-starting the system, terminate the automatic driver search for the graphic board driver and use the installation CD instead.

Note:
The graphic driver will be installed twice.

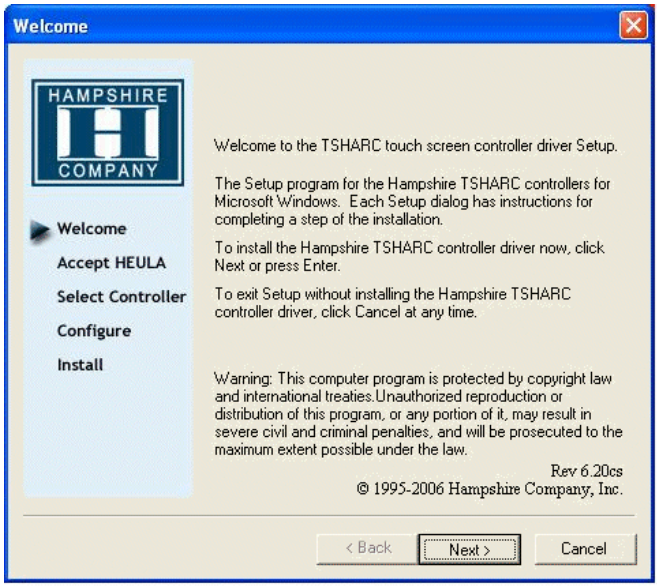
5. After finishing the installation and re-starting the EPC, the following entries are available under the **Display** icon in the Control Panel, or in the display properties.



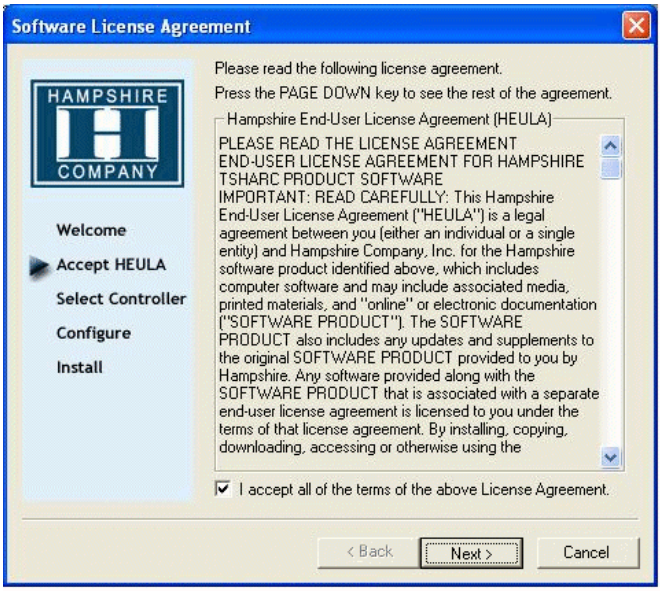
4.5 Touch Screen Installation

Note:
Make sure to use a touch driver of version 6.20.cs or higher.

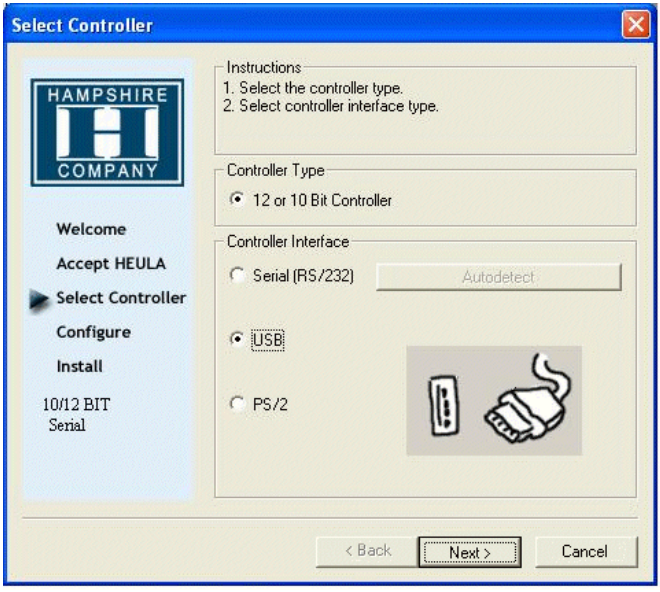
1. Start the touch screen installation from the driver CD, and press **Next**:


Welcome
HAMPSHIRE
COMPANY
Welcome
Accept HEULA
Select Controller
Configure
Install
Welcome to the TSHARC touch screen controller driver Setup.
The Setup program for the Hampshire TSHARC controllers for Microsoft Windows. Each Setup dialog has instructions for completing a step of the installation.
To install the Hampshire TSHARC controller driver now, click Next or press Enter.
To exit Setup without installing the Hampshire TSHARC controller driver, click Cancel at any time.
Warning: This computer program is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Rev 6.20cs
© 1995-2006 Hampshire Company, Inc.
< Back
Next >
Cancel

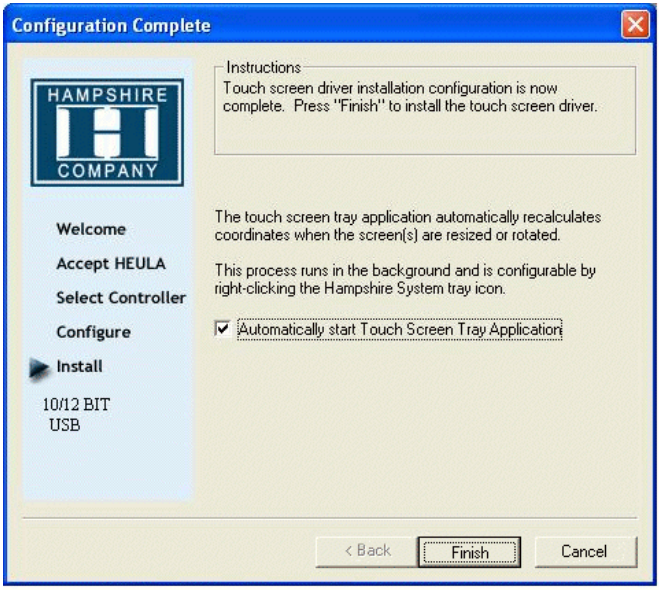
2. Accept the license agreement.


Software License Agreement
HAMPSHIRE COMPANY
Welcome
Accept HEULA
Select Controller
Configure
Install
Please read the following license agreement.
Press the PAGE DOWN key to see the rest of the agreement.
Hampshire End-User License Agreement (HEULA)
PLEASE READ THE LICENSE AGREEMENT
END-USER LICENSE AGREEMENT FOR HAMPSHIRE TSHARC PRODUCT SOFTWARE
IMPORTANT: READ CAREFULLY: This Hampshire End-User License Agreement ("HEULA") is a legal agreement between you (either an individual or a single entity) and Hampshire Company, Inc. for the Hampshire software product identified above, which includes computer software and may include associated media, printed materials, and "online" or electronic documentation ("SOFTWARE PRODUCT"). The SOFTWARE PRODUCT also includes any updates and supplements to the original SOFTWARE PRODUCT provided to you by Hampshire. Any software provided along with the SOFTWARE PRODUCT that is associated with a separate end-user license agreement is licensed to you under the terms of that license agreement. By installing, copying, downloading, accessing or otherwise using the
I accept all of the terms of the above License Agreement.
< Back
Next >
Cancel

3. Select **Autodetect** or manually select the technical connection data.



4. Press **Finish** and follow the instructions for a re-start.


Configuration Complete
HAMPSHIRE
COMPANY
Welcome
Accept HEULA
Select Controller
Configure
Install
10/12 BIT
USB
Instructions
Touch screen driver installation configuration is now complete. Press "Finish" to install the touch screen driver.
The touch screen tray application automatically recalculates coordinates when the screen(s) are resized or rotated.
This process runs in the background and is configurable by right-clicking the Hampshire System tray icon.
Automatically start Touch Screen Tray Application
< Back
Finish
Cancel

5. After a re-start of the operating system you will find *Hampshire Control Panel* among the programs.
6. Calibrate the touch screen with your finger or with a rounded pointed touch pen.

4.6 Installation of LAN-/Network Card

After installing the operating system and the chipset driver, the system automatically creates a link to a network connection. You will find a network icon on the lower right-hand side of the task bar.

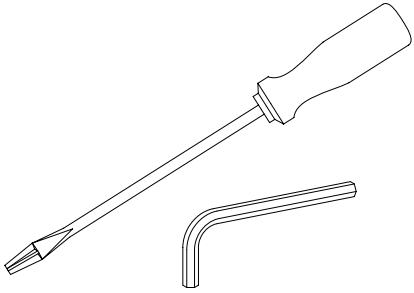
1. To install the second network card, follow the instructions on the driver CD.
2. Confirm each installation step and re-start the EPC at the end of the installation.
3. After the re-start two new network icons appear in the right hand side lower task bar.
4. You can now configure both network cards to your own requirements (IP-address etc.) via the system control.
5. Via the MS-DOS window, under **Start/All Programs/Accessories/ Command prompt**, you can set a "connection PING" to test your connections to the server and other PC's.
   (for example: **C:\ping 192.168.5.100**).

5 Service

5.1 Introduction

Only spare parts recommended by Beijer Electronics may be used.

5.1.1 Tools



You can carry out the disassembly and assembly with an 2.5 mm Allen key and a Phillips head screwdriver, size 3.

5.1.2 Preparation

Disconnect the EPC from the power supply.

Attention! Deadly Peril!
Make sure that your electrostatic pad does not damage the front panel of the EPC.

5.1.3 Opening the EPC

All operations to the opened EPC may only be carried out by authorized personnel. Only the expansion of hardware with memory and plug-in-cards is permissible within the defects liability period.

Note:
Inside the EPC there are electronic components which can be destroyed by electrostatic charges. Therefore cautionary measures have to be taken from the moment the EPC is opened. These can be found in the guidelines for electrostatic endangered components (EGB-guidelines).

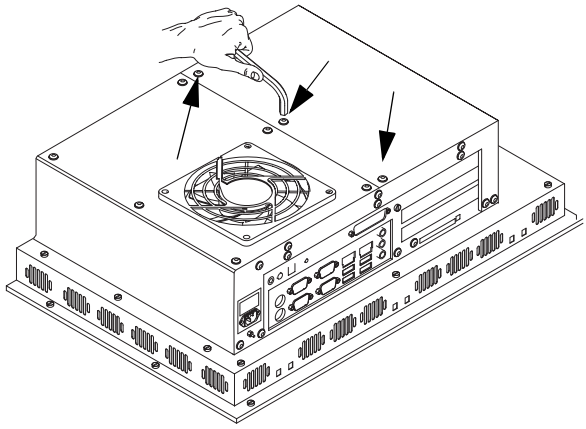
5.2 Changing the Fan Filter

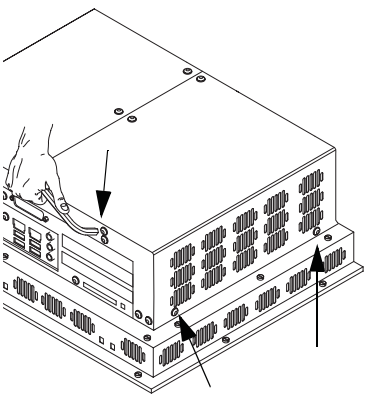
The fan filter will have to be replaced regularly, especially in dusty environments. Gently remove the fan cover, remove the filter and insert a new filter in its place.

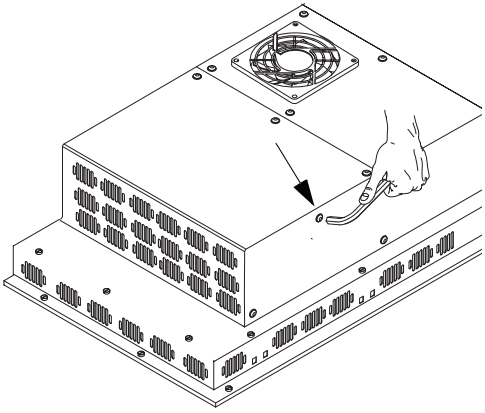
5.3 PCI-board Installation

To install a PCI-board the right hand side part of the rear enclosure has to be removed.

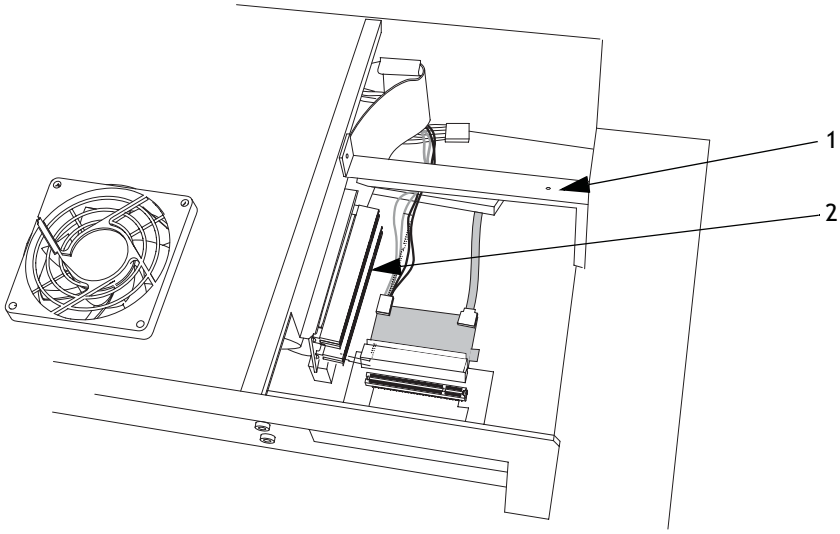
1. To open the enclosure remove the marked seven screws with an Allen key. After removing the screws the enclosure can be easily removed.



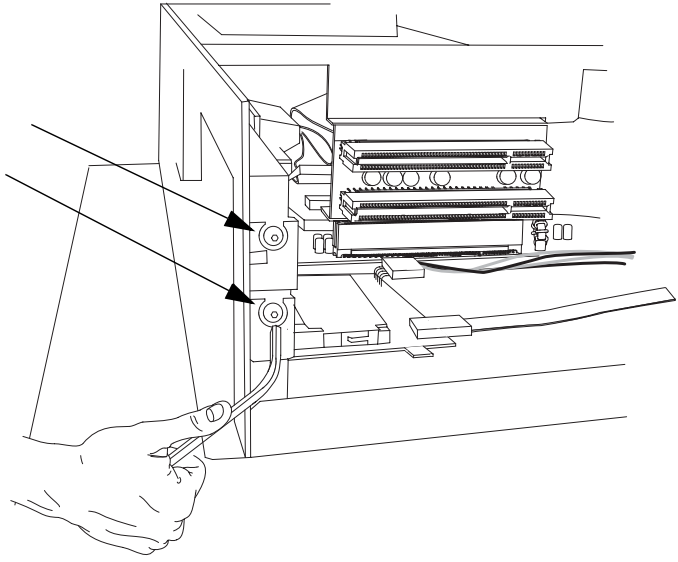




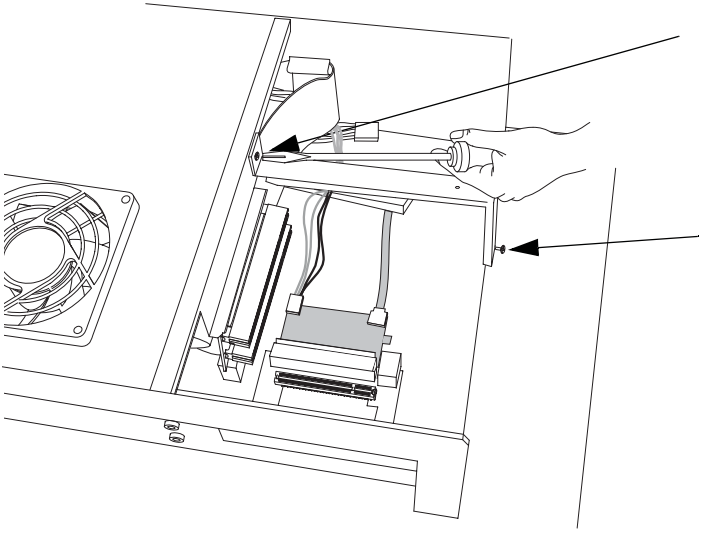
The picture of the opened EPC below shows the board holder (1) and the 2 PCI-slots (2).



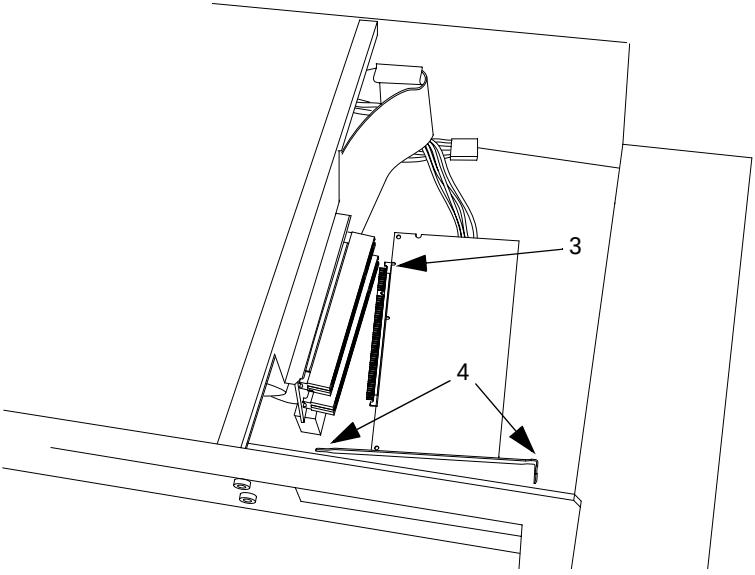
2. Remove the cover of the desired slot to insert your PCI-board, by removing the screw and pulling out the cover.



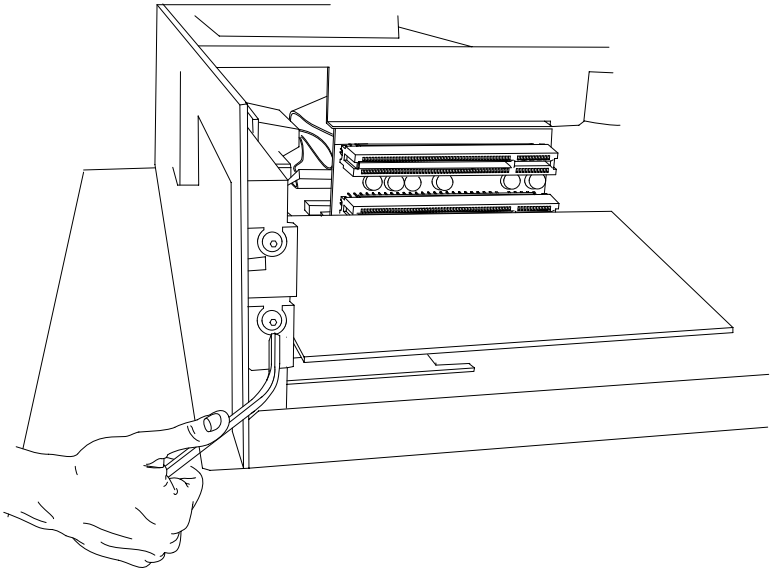
3. Remove the board holder by unscrewing the two marked screws.



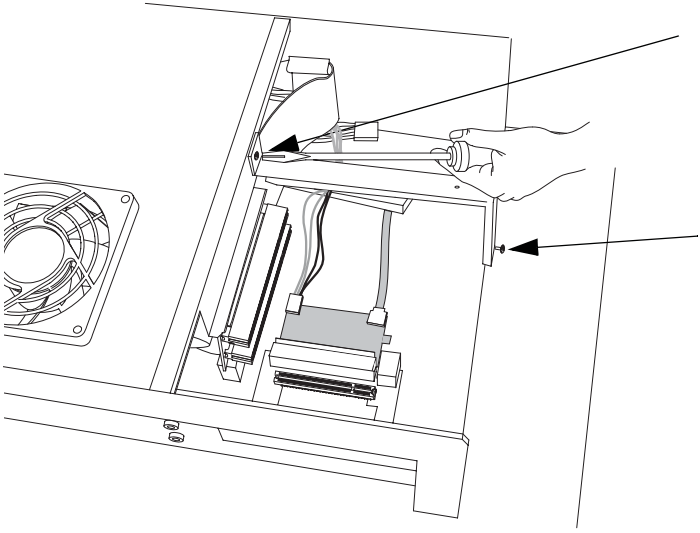
4. Insert the PCI-board, if necessary bend the slot bracket a little bit. Please ensure a correct fit at the rear edge (3) of the slot and make sure the metal bracket goes into the groove (4).



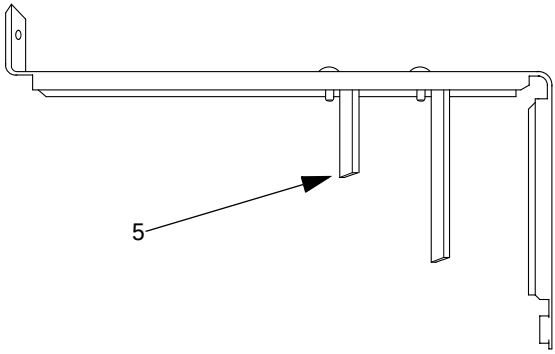
5. Mount your PCI-board and make sure to properly tighten the screw.



6. Re-assemble the board holder and tighten the two screws properly.



7. To ensure an optimal use of the board holder, we recommend that you put wide boards in the lower slot and narrow boards in the upper. This way the support can be used in the correct way.



Note:
If two wide boards are used, the short support (5) can be removed.

6 Technical Data

The EPC T150/T170/T190 C2D and EPC 1500t/1700t/1900t C2D models have touch screens; the EPC 150/170/190 C2D and EPC 1500/1700/1900 C2D models have an antireflective glass.

Parameter	EPC T150/150 C2D	EPC T170/170 C2D	EPC T190/190 C2D
	EPC C2D 1500t/1500	EPC C2D 1700t/1700	EPC C2D 1900t/1900
Size, W x H x D,	452 x 357 x 159 mm	480 x 377 x 164 mm	480 x 377 x 164 mm
Mounting depth	153 mm (253 mm including clearance)	158 mm (258 mm including clearance)	
Front panel seal	IP65		
Rear panel seal	IP20 according to DIN EN 60529		
Weight	8 kg	10 kg	12 kg
Processor	Intel Core 2 Duo		
Cache / Bus Speed	4 MB / 800 MHz		
System chipset	Intel GME965 (Crestline)		
BIOS	Award 4 MBit Flash memory, ACPI support		
RAM	2 GB DDR2-SDRAM (SODIMM), max. 4 GB		
Graphics chip	Intel ICH8M		
IDE controller	1 x IDE port, supports Ultra ATA 100/66/33		
SATA controller	3 x SATA port, up to 3 GB/s, AHCI support		
Serial ports	2 x RS232		
Ethernet	2 x 10/100/1000 Mbps		
USB ports	4 x USB 2.0 (rear side)		
Extension slots	2 x PCI up to 220 mm length		
Compact Flash ports	1 x internal (optional) bootable 1 x external not bootable		
Keyboard/mouse	2 x PS/2		
VGA	For external monitor, supports QXGA 2048 x 1536		

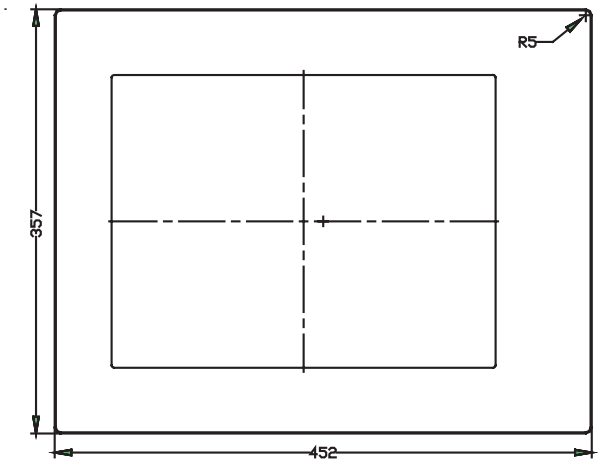
Parameter	EPC T150/150 C2D	EPC T170/170 C2D	EPC T190/190 C2D
	EPC C2D 1500t/1500	**EPC C2D 1700t/1700**	**EPC C2D 1900t/1900**
DVI	For external monitor, supports DVI 1.0		
Audio ports	Line in/out, microphone in		
Power consumption at rated voltage	85 VA		
Fuse	1 AT (230 V AC) or 6.3 AT (24 V DC)		
Power supply options	115-230 V AC ± 15%. 0.8 A max (switch on peak 30 A).		
	24 V DC ± 15%. 3 A max (switch on peak 15 A).		
	CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4 UL and cUL: The power supply must conform with the requirements for class II power supplies.		
Active area of display	304.1 x 228.1 mm	337.9 x 270.3 mm	376.3 x 301.1 mm
Pixels	1024 x 768	1280 x 1024	
Pixel pitch (RGB)	0.297 x 0.297 mm	0.264 x 0.264 mm	0.294 x 0.294 mm
Max. number of colors	16.7 million		
View angle (up/down/left/right) (typical)	140 °/140 °	178 °/178 °	170 °/170 °
Light intensity (typical)	250 cd/m^2		
Contrast ratio	800:1	1500:1	500:1
Response time	2/6 ms	15/10 ms	
Display technology	TN	PVA	
Touch screen technology	Resistive		
Touch screen resolution	4096 x 4096 points*		
Ambient temperature	0 ° to +50 °C		
Storage temperature	-20 ° to +65 °C		
Relative humidity	<90% non-condensed		
CE approvals	Noise tested according to EN61000-6-4 emission and EN61000-6-2 immunity		

Parameter	EPC T150/150 C2D	EPC T170/170 C2D	EPC T190/190 C2D
	EPC C2D 1500t/1500	EPC C2D 1700t/1700	EPC C2D 1900t/1900
UL, cUL approvals (when product or packing is marked)	UL 508		
Vibration	0.035 mm (10 … 58 Hz), 5 m/s² (58 … 500 Hz) for EN60068-2-6		
Shock	15 g, 11 ms, half sine for EN60068-2-27		

* only for EPC T150/T170/T190 C2D / EPC C2D 1500t/1700t/1900t

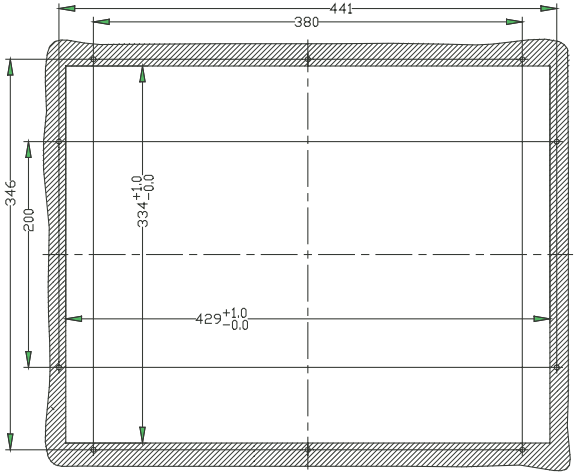
7 Drawings

7.1 EPC T150/150 C2D / EPC C2D 1500t/1500 Front View



7.2 EPC T150/150 C2D / EPC C2D 1500t/1500 Cut Out Drawing

Cut out dimensions: 429.0 x 334.0 mm.

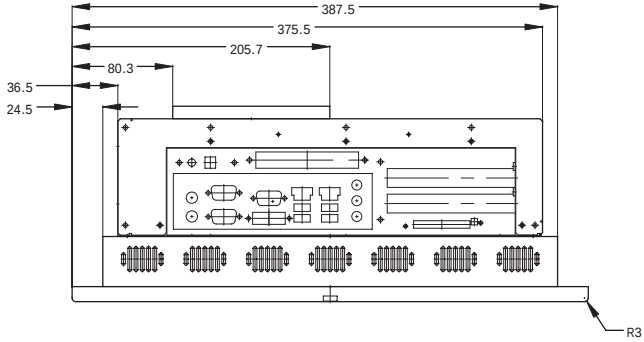


Mounting method: 10 holding blocks with threaded pins (M5x30) DIN 914 hexagonal bolt.

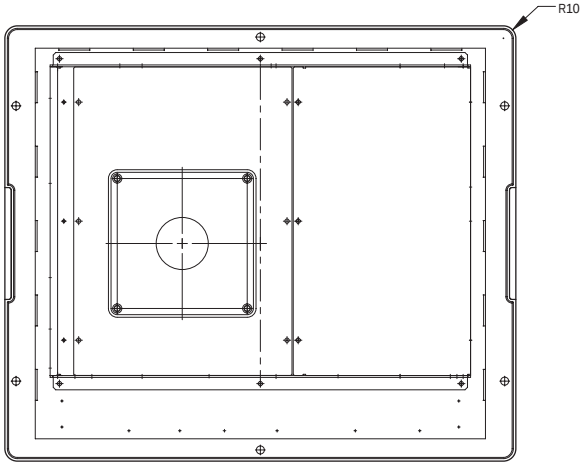
Max. 3 mm thick mounting frame.

7.3 EPC T150/150 C2D / EPC C2D 1500t/1500 Outline Drawings

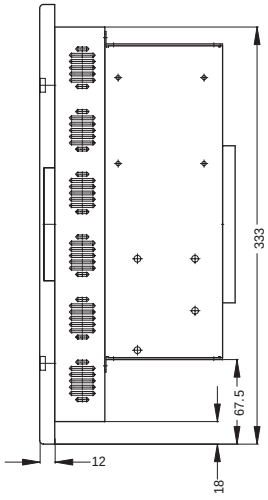
Bottom view



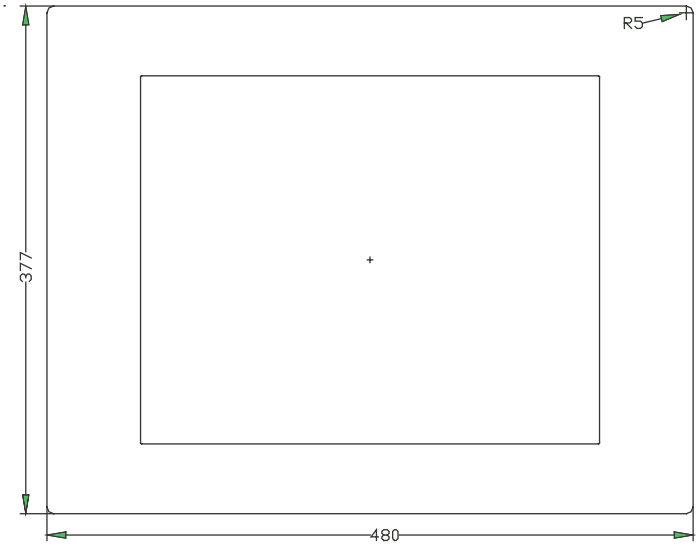
Rear view



Side view

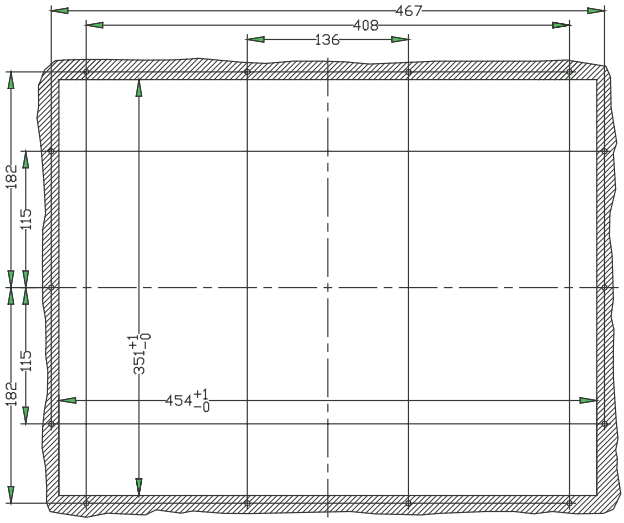


7.4 EPC T170/170 C2D / EPC C2D 1700t/1700 Front View



7.5 EPC T170/170 C2D / EPC C2D 1700t/1700 Cut Out Drawing

Cut out dimensions: 454.0 x 351.1 mm.

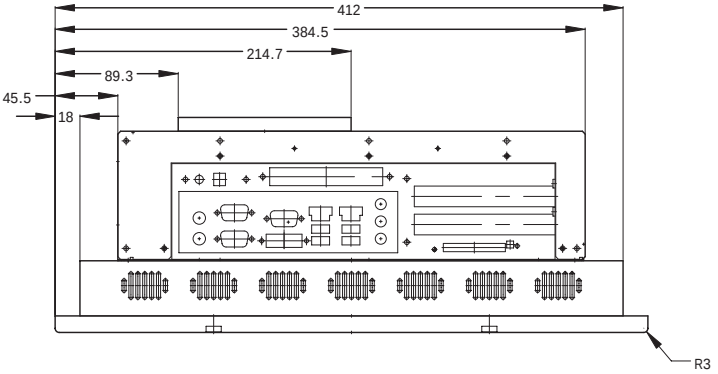


Mounting example with 14 threaded pins (M4x16) pressed into the front panel.

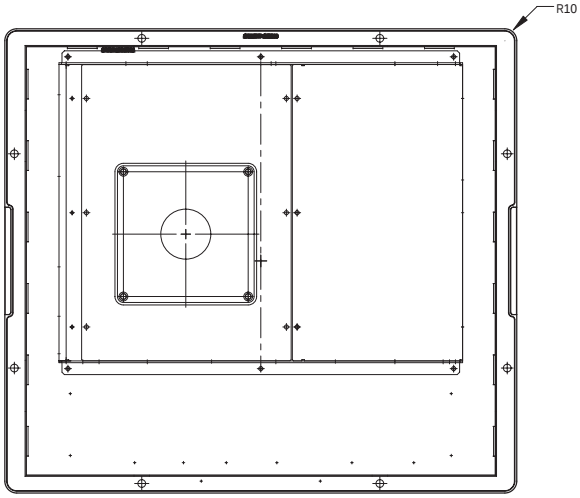
Max. 5 mm thick mounting frame.

7.6 EPC T170/170 C2D / EPC C2D 1700t/1700 Outline Drawings

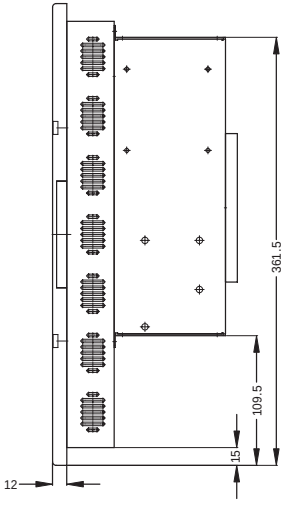
Bottom view



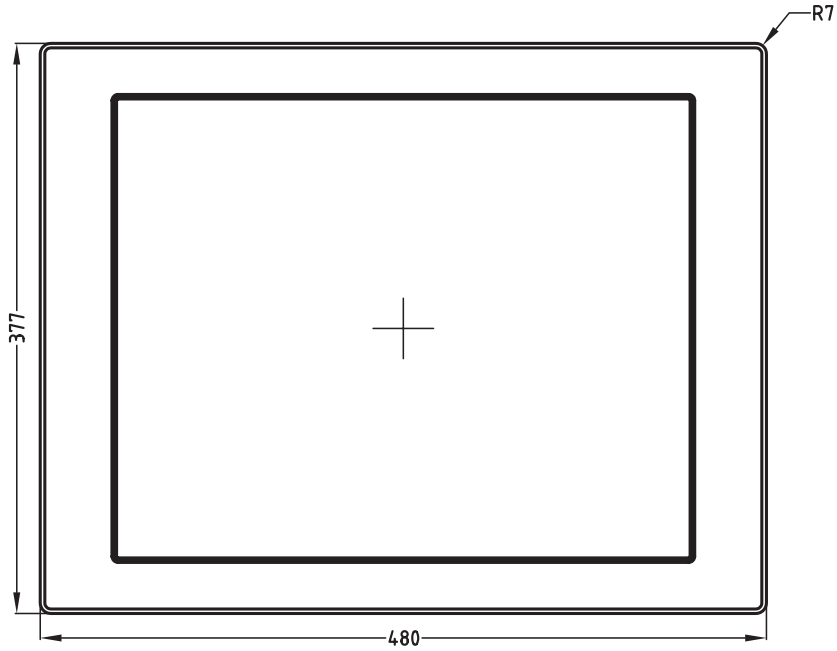
Rear view



Side view

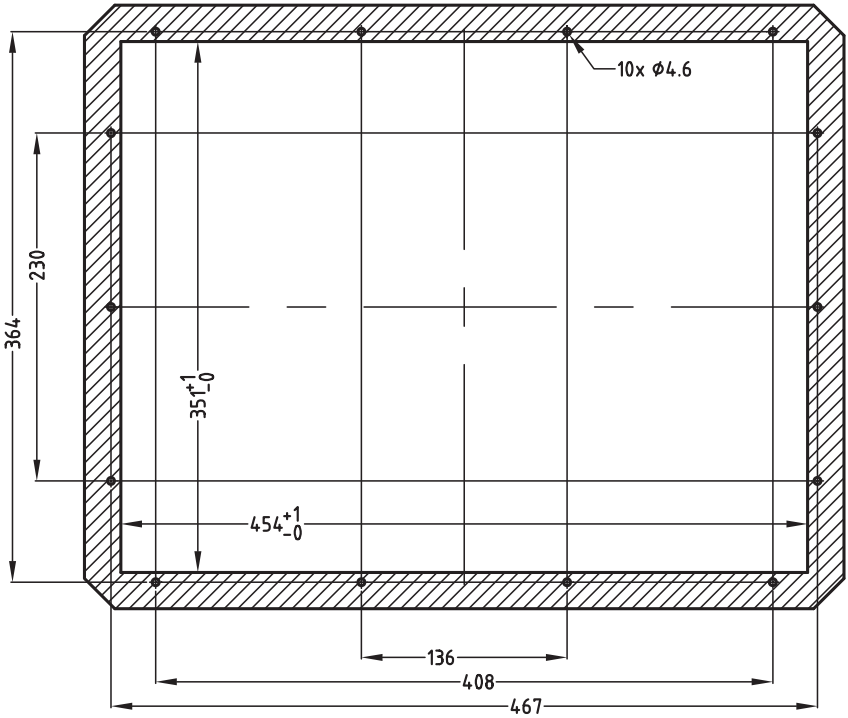


7.7 EPC T190/190 C2D / EPC C2D 1900t/1900 Front View



7.8 EPC T190/190 C2D / EPC C2D 1900t/1900 Cut Out Drawing

Cut out dimensions: 454.0 x 351.0 mm.

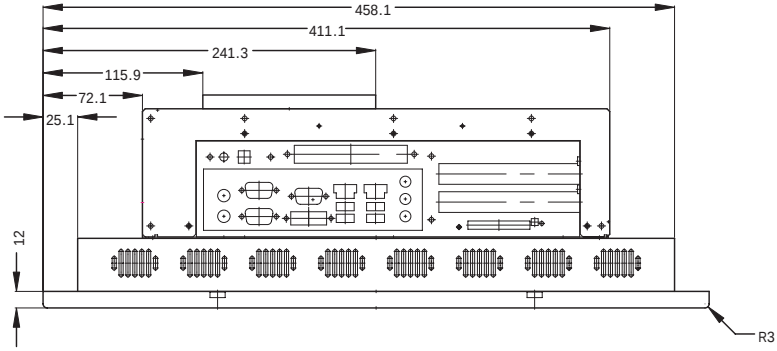


Mounting example with 14 threaded pins (M4x16) pressed into the front panel. Mounted with 14 nuts.

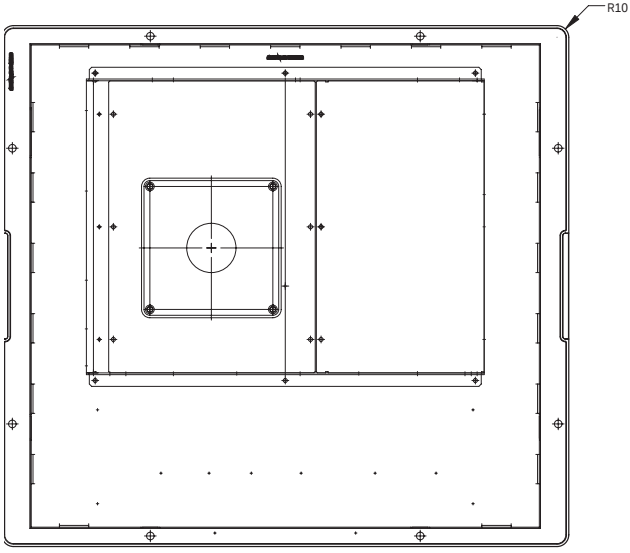
Max. 5 mm thick mounting frame.

7.9 EPC T190/190 C2D / EPC C2D 1900t/1900 Outline Drawings

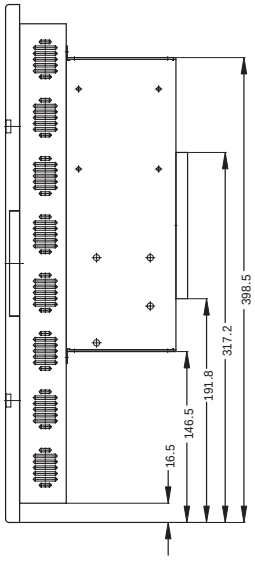
Bottom view



Rear view

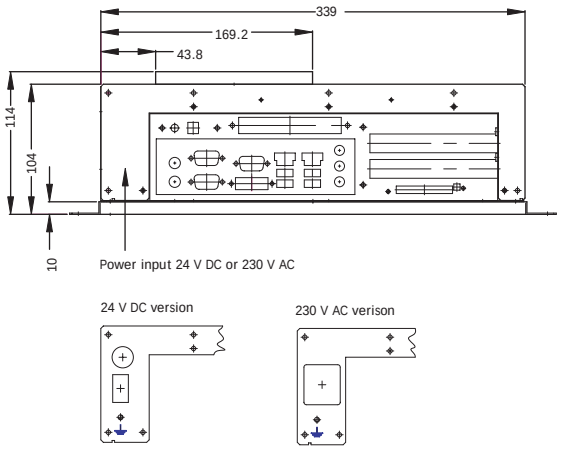


Side view

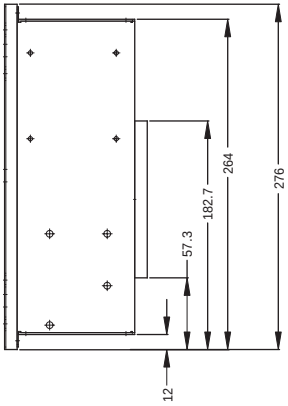


7.10 EPC Box C2D Outline Drawings

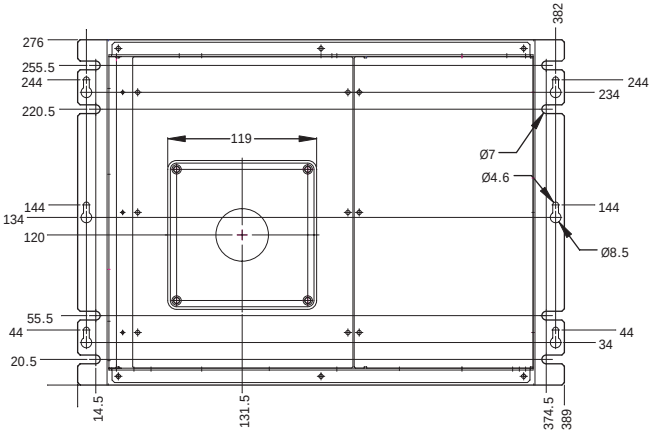
Bottom view



Side view



Rear view



Mounting method: 6 x M4x12 steel screws DIN 912 or 4 x M6x12 steel screws DIN 912. Screws are included.

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